or discouragement, when they see that the book bears its inevitable dedication to an old and honored teacher, Georg Waitz, on the occasion of his twenty-fifth "Jubelfeier." When may the oldest and most honored American professor of distant centuries begin to hope that one student of his will ever remember him or his "Jubelfeier," or dedicate so much as a penny pamphlet to its honor?

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3. — *Grundzüge der physiologischen Psychologie.* Von WILHELM WUNDT. Leipzig: Engelmann. 1874. 8vo. pp. 870.

ON every hand, no less in Germany than in England, there are signs of a serious revival of philosophical inquiry; from a quarter, too, which leads one to indulge the hope that real progress will erelong be made. For it is the men engaged in the physical sciences who are now pressing hard in the direction of metaphysical problems; and although in a certain point of view their education may not specially qualify them for the task, it would be sheer folly not to expect from their trained cunning in experiment, their habits of patience and fairness, and their willingness to advance by small steps at a time, new results of the highest importance.

Nowhere is the new movement more conspicuous than in psychology, which is of course the antechamber to metaphysics. The physiologists of Germany, devoid for the most part of any systematic bias, have, by their studies on the senses and the brain, really inaugurated a new era in this science. Where quasi-scholastic distinction and nomenclature were the only instrument of advance, we now find measurements and objective reactions to help us on our way. And in the main, whilst in France thoroughly, and in England still faintly, the old jealousy between the objective and the subjective methods survives, the one as patronized by religious, the other by materialistic speculation, we find that in Germany the minds of the best investigators on either side are wholly unpreoccupied with any such militant consciousness. The spiritualist Lotze is as hearty a physiologist as the materialist Moleschott; while it is hard to guess from the psychologic contributions of Fechner, Helmholtz, Mach, and Horwicz, what their theologic or anti-theologic bias may be, or if they have any at all. This detachment of mind is very healthy, and is in striking contrast with what such writers as Mill, Maudsley, and Huxley show us in England, and McCosh and Porter in this country. But even here we find in Hodgson and Lewes the beginning of a new era of temper, destined

surely to be more fruitful than the old régime of unfairness and recrimination.

The Heaven-scaling Titans have had their day in Germany, and the confident systems lie in the dust; for the school-boy performances of a Haeckel and the sensational paradoxes of a Hartmann cannot count as philosophy. A season of headache and apathy, with bald *Empirie*, the mere registration of facts, for a diversion, ensued, as was natural after such a metaphysical debauch. There is something almost dramatic in the way in which the thirsty spirit of man is seen to be regaining its normal appetite again, and with its new desires, indulging in new hopes. Only maturity has brought circumspection, and the old rash notion of scaling the opaque walls of existence by a quick *coup de main*, and ravishing the secret within in an instant, has been given up. The method of patience, starving out, and harassing to death is tried; Nature must submit to a regular *siege*, in which minute advantages gained night and day by the forces that hem her in must sum themselves up at last into her overthrow. There is little of the grand style about these new prism, pendulum, and galvanometer philosophers. They mean business, not chivalry. What generous divination, and that superiority in virtue which was thought by Cicero to give a man the best insight into nature, failed to do, their spying and scraping, their deadly tenacity and almost diabolic cunning, must some day accomplish.

Such as they are, Professor Wundt, the title of whose latest work heads our article, is perhaps their paragon; and his whole career is at the same time a superb illustration of that thoroughness in education for which Germany is so renowned. In that learned land Browning's fable of the Grammarian's Funeral is re-enacted every day. Poor Waitz, for instance, who died a few years ago with his monumental *Anthropologie der Naturvölker* unfinished, began that work merely to educate himself for the study of psychology and the philosophy of religion. Wundt is more fortunate than Waitz, for he has at last reached, at Zürich, the goal he evidently strove for from the first, a University Chair of Philosophy. Still young, his apprenticeship is over and the fruit is to be reaped. But what an apprenticeship! To be Helmholtz's colleague as professor of physiology at Heidelberg; to spend years in a laboratory and to publish numerous elaborate experimental researches; to write a large treatise on Physics, and an admirable handbook of Physiology (both of which have had several editions and been translated into French), besides two volumes of lectures on Psychology, an essay on the law of causation, and various fugitive articles; to study each new subject by giving a year's

course of lectures upon it, — these are *preparations* on a scale rather fitted to cool than to excite the ardor of an American neophyte in philosophy.

Nevertheless Wundt has now laid them behind him, and in this compactly printed volume he takes, so to speak, an account of stock before embarking on his new career. The work certainly fills a *lacuna*, and circumscribes in a very convenient way all those phenomena of human life which can be studied both by introspection and by objective investigation. The anatomy and physiology of the nervous centres and organs of sense occupy about one third; the natural history of sensations, pleasures, and pains, and perceptions spatial and temporal, follow; and analyses of the æsthetic, volitional, and self-conscious life conclude. The style is extremely concise, dry, and clear, and as the author is as thoroughly at home in the library as in the laboratory, the work is really a cyclopædia of reference. If, through a large part of it, the reader finds that physiology and psychology lie side by side without combining, it is more the fault of the science than of the author. He has registered no detail without doing his best to reduce and weave it in with the mass. Indeed so uninterrupted is his critical elaboration, that we can think of no book (except perhaps the "Origin of Species") in the course of which the author propounds so many separate opinions.

Their multiplicity forbids our even attempting to give an account of them. But we may single out one or two for notice. Every one has heard of the measurements of the velocity of nervous action which Helmholtz inaugurated. Wundt, after having worked at the subject experimentally for fourteen years, with interruptions, may fairly claim to have brought it for the present to a conclusion. The principle is this: a signal is given to the subject who, immediately on its reception replies by closing an electric key. The instant of the signal and of the closure are chronographically registered, and the time between them ascertained; and according to the circumstances of the experiment this time undergoes some very interesting variations, whose interpretation by Wundt seems to us particularly felicitous. In a previous chapter on Attention and Consciousness, he has adopted a convenient nomenclature which really is something more than a metaphor. "If we say of all the representations present to the mind at any one time that they are in the *field of vision* of consciousness, we may call that part of them to which the attention is particularly directed the *inward point of sight.* The entrance of a representation into this inner field of vision may be called Perception; its entrance into the focus or point of sight, Apperception."

(p. 717.) Now the latter act is often a volitional effort on the part of the subject, a focusing of the attention upon the impression, which adjustment occupies a distinct interval of time. This interval is a part of the time registered in the experiments just referred to. It, *plus* the time occupied in the volitional innervation of the motor nerves which provoke the movement by which the key is closed, are called by Wundt together, the *time of reaction.* It is this interval of psychical activity which is variable according to the experimental conditions. The other subdivisions of the total time, that of transmission from the organ of sense to the brain, that of "perception," and that of transmission to the muscle, are probably invariable. Now the experimental circumstances which shorten the time of reaction are mainly those which define beforehand as to its quality, intensity, or time, the signal given to the observer, so that he may accurately expect it before it comes. The focusing of the attention takes place under these circumstances *in advance.* Where, for instance, we are warned preliminarily by a slight sound that the signal is going to occur, the registered time is reduced to a minimum. The attention, in other words, "is so exactly adjusted to the entrance of the signal into the inner field of vision, that at the very instant of perception, apperception likewise occurs, and with apperception, the volitional mandate." More remarkable still! the time registered may be reduced to zero, that is, the signal may be given and the key closed at objectively the same instant, so that not only the "reaction-time," but also the physiological duration of nerve transmission to and from the brain are abolished. This paradox amounts to saying that the impression is apperceived before it actually occurs, or that expectant attention is equivalent to objective stimulation.* And the same phenomenon is made even more strikingly manifest by another set

* The reason why, in these not very frequent cases, we do not notice the signal *twice* (once as apperceived in advance by our spontaneous attention, and once passively after it has occurred) is probably to be sought in another series of experiments which show that one act of apperception, if it be at all intense, prevents the apperception of other nearly simultaneous impressions. This is by virtue of what Wundt calls the "law of discrete flow" in representations. "Attention demands a certain time to pass from one impression to another. As long as the first impression lasts the entire attention is bent upon it, and cannot, therefore, focus itself in advanee, in order to apperceive the second impression at the very instant of its occurrence." The second will then either be apperceived late, or abort, unless indeed it can coalesce in one conception with the first. Of all impressions "perceived," none are remembered for more than a minute, except those which are "apperceived," or brought to the inner focus. In the case related in the text, the *real* impression may either abort (pass unnoticed, unapperceived) or it may coalesce with the imaginary one.

of Wundt's original investigations, which we have not space to describe.

We select these particular researches for notice because they demonstrate as it were mathematically what empiricists are too apt to ignore, — the thorough-going participation of the spontaneous mental element in determining even the simplest experiences. The *a posteriori* school, with its anxiety to prove the mind a *product, coûte que coûte*, keeps pointing to mere "experience" as its source. But it never defines what experience is. *My* experience is only what I agree to attend to. Pure sensation is the vague, a semi-chaos, for the *whole* mass of impressions falling on any individual are chaotic, and become orderly only by selective attention and recognition. These acts postulate *interests* on the part of the subject, — interests which, as ends or purposes set by his emotional constitution, keep interfering with the pure flow of impressions and their association, and causing the vast majority of mere sensations to be ignored. It is amusing to see how Spencer shrinks from explicit recognition of this law, even when he is forced to take it into his hand, so to speak. Mr. Bain, in principle, admits it, but does not work it out. The only English-writing empiricist who has come near to making any use of it is Mr. Chauncey Wright, in his article on the Evolution of Self-Consciousness in this Review for 1873.

Another section important to English readers is that devoted to touch, vision, and the cognition of space. Wundt's account of vision is unapproached by anything in our language for thoroughness and subtlety. His conclusion as to the nature of our notion of space is in one word this: "It is the resultant of a distinct psychologic process, ... which may be called a *synthesis*, because the evolved product shows properties which are not present in the sensuous material used in its construction." That is to say, our *intuition* of space within the limits in which it exists — a very different thing from our *idea* of space, which has no limits — is that of an undivided *plenum*, a perfectly simple and specific *quale* or affection of consciousness. Whether this new quality of feeling once arisen is *fertile*, that is, whether it be analyzable into different elements from those by whose synthesis it arose, giving us new relations, new propositions concerning them, propositions not *merely* expressive of the *particular* tactile, retinal, and muscular experiences that generated the form of intuition, — this is not decided by Wundt, nor do we here affirm it. To prove it would be essentially to reinstate the Kantian philosophy, that is, to vindicate for the mind not only a native wealth in forms of sensibility, — every empiricist must admit

that! — but the possession of forms with synthetic judgments involved in them.

Wundt's term "synthesis" reminds one of the term "mental chemistry" used by the Mills, or rather admitted into their works, but not used; for both they, Bain, and Spencer are so desperately bent on covering up all tracks of the mind's originality (especially in this field of space, preoccupied by Kant), that they utterly repudiate mental chemistry here, and labor with an energy worthy of a better cause to procure out of mere "association" something never given in any one of the ideas associated, something which after all they have to *escamoter* out of their sleeve as it were, or, in the absurd Spencerian fashion, to call "nascent," and trust that, in that seemingly infantile and innocent guise, you will take no alarm at its intrusion.

We are not at all concerned with the ultimate philosophical bearings of this particular question. Settle the particulars, and philosophy will take its turn. But to be so bribed beforehand by philosophical antipathies as to ignore evidence and shirk conclusions, is a poor business for either psychologist or physiologist.

The notion of mental synthesis or chemistry opens the way to interesting questions. Hitherto most thinkers have admitted that in a state of consciousness the *esse* and the *existere* were one and the same thing, namely, the *sentiri*. In the conscious sphere reality and phenomenon, substance and accident, nature and property, cannot be distinguished as they are in the objective sphere. A thought has only one mode of being at all, namely, as that very thought. *It* cannot become a different thought, nor can it cease to be *thought* without ceasing to *be* altogether. But in the material world, that which we call one and the same thing, a *leaf*, for instance, has relations, and differs according to the point of view. It was green and is now brown. It is a product of chemical forces, a reducing agent, a form of beauty, an effect of luminiferous ether, an affection of my sensorium each in turn, and yet preserves what we call its identity throughout.

Now when, in this matter of space, we see feelings of innervation and retinal impressions combining into a novel *quale* of consciousness, what are we to say? Do *they* really exist within the new *quale*, or, in other words, have they, in addition to their simple *sentiri*, another existence, a sort of objective substantiality which may betray itself by producing effects, — we being conscious of the effect, but no longer of the original feeling? Or is the process a logical one, the simple feelings being really "perceived" by the mind, but only used as signs to suggest the higher product, that alone being "apperceived," whilst the signs are unnoticed and forgotten? Or, thirdly, have the

simple feelings never existed at all as feelings, and has the resultant intuition of space a purely physiological antecedent, in the shape of the *combined* nervous action, whose components, when they were separately excited, corresponded to the retinal and other feelings? These problems lie over the whole field of psychology, and are worthy of explicit discussion.

Wundt does not deal with them at all, except by implication, as above. Neither does he seem ever to have entertained the hypothesis advanced by several English writers recently, that conscious states have no dynamic relations either with each other or with the nervous system. He assumes throughout that feelings as such may combine with each other (as we have just seen in regard to space), and that they may also act as nervous stimuli. We think, for our part, that the Englishmen (only two of whom, Hodgson and Clifford, have deigned to give reasons for their belief) are prematurely dogmatic. Taking a purely naturalistic view of the matter, it seems reasonable to suppose that, unless consciousness served some useful purpose, it would not have been superadded to life. Assuming hypothetically that this is so, there results an important problem for psycho-physicists to find out, namely, *how* consciousness helps an animal, how much complication of machinery may be saved in the nervous centres, for instance, if consciousness accompany their action. Might, for example, an animal which regulated its acts by notions and feelings get along with fewer preformed reflex connections and distinct channels for acquired habits in its nervous system than an animal whose varied behavior under varying circumstances was purely and simply the result of the change of course through the nervous reticulations which a minute alteration of stimulus had caused the nervous action to take? In a word, is consciousness an economical *substitute* for mechanism?

Wundt's book has many shortcomings, but they only prove how confused and rudimentary the science of psycho-physics still is. More workers and critics are wanted in the field, propounders of questions as well as of answers. Whoever they may be, they will find this treatise indispensable for study and reference. All we have cared to do has been to call attention to its importance and to the merits of its singularly acute and learned author.